

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Status of the claims

Claims 1 and 10 are amended. New claim 11-18 are added. No new matter is added.

Claim Rejections – 35 USC §103

Claims 1-8 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Hirose et al., (JP 2001-202837 A, hereinafter Hirose) in view of Graneau et al., (U.S. Patent Publication No. 3,646,243, hereinafter Graneau). This rejection is respectfully traversed.

Claim 1, as amended, recites among other features, a method of operating a superconducting cable comprising:

each of said first and second circuits having a respective refrigerator arranged in a refrigerant flow path on an upstream side of both of said superconducting cables of said first and second circuits, said flow path of said first and second circuits being connected to each other on the upstream side of said refrigerators, and said flow path of said first and second circuits being connected to each other on the downstream side of said superconducting cable; and

controlling the cooling by cooling said superconducting cable of said second circuit with refrigerant cooled by both of the refrigerators for said first and said second circuits. (See, for example, Original Specification, Fig. 1 and pages 10-11)

Hirose and Graneau, alone or in combination fail to teach, suggest or render predictable at least the above recited claimed features. Hirose, teaches providing a cooling system including a freezer in the longitudinal direction of the cable for every constant interval, in order to always hold a very low temperature. (Hirose, ¶ 3) In particular, Hirose teaches a cooling system that is in a “longitudinal direction” and does not teach or suggest “each of said first and second circuits having a respective refrigerator arranged in a refrigerant flow path on an upstream side of both of said superconducting cables of said first and second

circuits said flow path of said first and second circuits being connected to each other on the upstream side of said refrigerators and said flow path of said first and second circuits being connected to each other on the downstream side of said superconducting cable.” Instead, Hirose on many instances teaches away from the above claimed features. For example, Hirose teaches the “refrigerant flow rate must be made to increase especially at the time of an overload.” (Hirose, ¶ 4) Next, in the “means for solving the problem” section, Hirose teaches, filling the inside of the cable core with a lower temperature refrigerant than the outside of the cable core as the preferred method for lowering the refrigerant temperature. (Hirose, ¶ 7) Therefore, Hirose teaches away from the claimed invention.

The Office Action of October 6, 2008 partially recognizes this, and admits that Hirose fails to teach plurality of cable circuit, control mechanism and switching mechanism and a failed circuit to provide refrigerant to a good circuit and cites Graneau as disclosed the above features. (Office Action of October 6, 2008, Page 3, lines 13-15) However, the Office Action of October 6, 2008 fails to recognize that neither Hirose nor Graneau teach, suggest or render predictable, the features of amended claim 1, such as but not limited to, each of said first and second circuits having a respective refrigerator arranged in a refrigerant flow path on an upstream side of both of said superconducting cables of said first and second circuits.

Graneau is cited as curing the above cited deficiencies of Hirose. (Page 3) However, Graneau fails to teach, suggest or render predictable, each of said first and second circuits having a respective refrigerator arranged in a refrigerant flow path on an upstream side of both of said superconducting cables of said first and second circuits. Instead, the circuits 10 and 11 have a refrigerant flow path that is configured to be in series and thus, said first and second circuits 10 and 11 do not have a respective refrigerator arranged in a refrigerant flow path on an upstream side of both of said superconducting cables of said first and second circuits. (Graneau, Fig. 1)

In particular, the refrigerator 17' may be on the upstream side of the circuit 11, but the refrigerator 17 is not on the upstream side of the circuit 11. Instead, refrigerator 17 is on the downstream side of the circuit 11. (Graneau, Fig. 5) Similarly, refrigerator 17 is on the upstream side of circuit 10, but the refrigerator 17' is on the downstream side of circuit 10.

Thus, Hirose or Graneau, alone or in combination, fail to teach or suggest the feature of claim 1, as amended.

Therefore, claim 1 is believed to be allowable for at least the reason stated above. Because claims 2-8 depend from claim 1, they are believed to be allowable for at least the same reasons claim 1 is believed to be allowable.

Amended claim 10 recites among other features, a plurality of superconducting cables connected by a parallel refrigerant flow path. Both Hirose and Graneau fail to recite a parallel refrigerant flow path. Therefore claim 10 is believed to be allowable.

New Claims

New claim 11 recites, among other features,

controlling the cooling by cooling said superconducting cable of said second circuit with refrigerant cooled by both of the refrigerators for said first and said second circuits.

first refrigerator being located upstream from the first superconducting circuit in the refrigerant flow path;

second refrigerator being located upstream from the second superconducting circuit in the refrigerant flow path;

providing a parallel refrigerant flow path for the refrigerant by connecting the flow path of the refrigerant upstream from the first and second refrigerators and downstream from the first and second superconducting circuits; and

cooling the first superconducting cable with the refrigerant from the first and second refrigerator by separating the refrigerant flow path for the second superconducting circuit from the refrigerant flow path for the first superconducting circuit. (See. for example, Original Specification, Fig. 1 and pages 10-11)

Hirose and Graneau, alone or in combination fail to teach, suggest or render predictable at least the above recited claimed features. Hirose, teaches providing a cooling system including a freezer in the longitudinal direction of the cable for every constant interval, in order to always hold a very low temperature. (Hirose, ¶ 3) In particular, Hirose

teaches a cooling system that is in a “longitudinal direction” and does not teach or suggest “providing a parallel refrigerant flow path for the refrigerant by connecting the flow path of the refrigerant upstream from the first and second refrigerators and downstream from the first and second superconducting circuits.” Instead, Hirose on many instances teaches away from the above claimed features. For example, Hirose teaches the “refrigerant flow rate must be made to increase especially at the time of an overload.” (Hirose, ¶ 4) Next, in the “means for solving the problem” section, Hirose teaches, filling the inside of the cable core with a lower temperature refrigerant than the outside of the cable core as the preferred method for lowering the refrigerant temperature. (Hirose, ¶ 7) Therefore, Hirose teaches away from the claimed invention.

The Office Action of October 6, 2008 partially recognizes this, and admits that Hirose fails to teach plurality of cable circuit, control mechanism and switching mechanism and a failed circuit to provide refrigerant to a good circuit and cites Graneau as disclosed the above features. (Office Action of October 6, 2008, Page 3, lines 13-15) However, the Office Action of October 6, 2008 fails to recognize that neither Hirose nor Graneau teach, suggest or render predictable, the features of amended claim 11, such as but not limited to, providing refrigerators upstream from the superconducting circuits and providing a parallel refrigerant flow path for the refrigerant by connecting the flow path of the refrigerant upstream from the first and second refrigerators and downstream from the first and second superconducting circuits.

Graneau is cited as curing the above cited deficiencies of Hirose. (Page 3) However, Graneau fails to teach, suggest or render predictable, providing a parallel refrigerant flow path for the refrigerant by connecting the flow path of the refrigerant upstream from the first and second refrigerators and downstream from the first and second superconducting circuits; and cooling the first superconducting cable with the refrigerant from the first and second refrigerator by separating the refrigerant flow path for the second superconducting circuit from the refrigerant flow path for the first superconducting circuit. Instead, the circuits 10 and 11 have a refrigerant flow path that is configured to be in series. (Graneau, Fig. 1)

In particular, during normal operation in Graneau, the refrigerant flows through the following path: refrigerating plant 17 to line 18 to three conductors 12 of circuit 10 to connection 22 (valve 64) to three conductors of 12 of circuit 11 to valve 21 back to refrigerating plant 17. In contrast, the embodiments of the present invention shown at least in Fig. 1 of the original specification, provide a parallel refrigerant flow path by at least connecting the flow path of the refrigerant upstream from the first and second refrigerators and downstream from the first and second superconducting circuits.

Specifically, Fig. 1 of the present application provides three circuits for the refrigerant connected in a parallel refrigerant flow path and a refrigerator for each superconducting circuit. During normal operation, the flow path of the refrigerant upstream from the refrigerator is connected, at the right end of Fig. 1. The refrigerant can be cooled by any of the refrigerators 211 to 213 in each path and thereafter the refrigerant flows through the superconducting cable circuits 110, 120 or 130. The flow path downstream from the superconducting cable circuits can be connected.

Hirose or Graneau utterly fail to teach or suggest the amended feature of claim 11. Therefore, Claim 11 is believed to be allowable for at least the reason stated above. Because claims 12-18 depend from claim 11, they are believed to be allowable for at least the same reasons claim 11 is believed to be allowable.

Concluding Remarks

After amending the claims as set forth above, claims 1-8, 10, and 11-18 are pending in this application.

Applicant believes that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested. The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

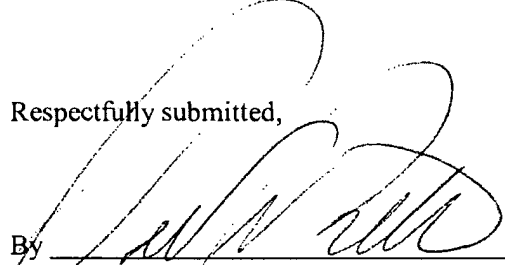
The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment,

to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by the credit card payment instructions in EFS-Web being incorrect or absent, resulting in a rejected or incorrect credit card transaction, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

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